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attempt is made to correlate the Grenville sediments south of the belt of igneous rocks, with the Pontiac series north of this belt, although the three possible theoretical relationships are given.

Chapter VI deals with "Special Problems of the Timiskaming Region," a brief summary of the literature together with evidences and conclusions reached from a detailed study of this particular area. Conclusions are given concerning such problems as the "Origin of Pillow Structure," "Origin of Ferruginous Dolomite," "Origin of Banded Gneisses," "Origin of the Cobalt Series"; a general discussion of the "Clay Belt of Northern Ontario and Quebec," and the "Origin, Extent, and Duration of Lake Barlow and Lake Ojibway."

In chapter VII the gold, silver, and molybdenite prospects of the area are described. When this report was written none of these prospects was developed to the state of producing mines. The great mantle of post-Glacial lake clays which cover a large part of the county makes prospecting difficult.

In a brief review of this Memoir it is impossible to give an adequate summary of the many important problems of pre-Cambrian geology discussed. This Memoir will be found useful to anyone interested in the problems of pre-Cambrian geology of Quebec and Ontario.

J. F. W.

The Paleozoic Rocks of the Canton Quadrangle. By G. H. CHADWICK. New York State Museum Bulletin, Nos. 217, 218. Albany, N.Y., 1919. Pp. 60, pls. 12, figs. 3, maps 1.

Across the northern third of this quadrangle the Paleozoic rocks form the country rock, while in the southern two-thirds they outcrop as outliers among the pre-Cambrian rocks. These Paleozoic rocks are Upper Cambrian and Early Ordovician in age. A section from the base up is as follows: Potsdam sandstone and conglomerate (Cambrian) 0-150 feet, followed by a possible unconformity, then deposition of white sandstone 100 (?) feet, Theresa dolomite and sandstone 50 feet, and Heuvelton white sandstone 10-25 feet in thickness, all of which are Saratogan or Ozarkian in age. The Heuvelton is followed by a disconformity and after this period of erosion the Ordovician (Beekmantown) represented by the Bucks Bridge mixed beds of dolomite and sandstone 50-75 feet in thickness, followed by an unconformity and above this unconformity the basal 30 feet of the Ogdensburg dolomite. These various formations are described in detail. The Heuvelton and all beds above it are fossiliferous, but the fossils are poorly preserved.

The Potsdam sandstone is thought to represent the residuum of insoluble material from deep and thorough weathering of pre-Cambrian gneiss and quartzite. The total absence of fossils, the undercut erosion in the Grenville quartzite at some of the contacts, the fine and even nature of the sand itself right up to the contacts suggest a wind-blown origin. The position, the tillite-like nature, and many other features of some of the basal beds of the Potsdam suggest glacial deposits but no striated pebbles were found. The late pre-Cambrian and Cambrian history of this region is thought to have been as follows: (1) peneplanation, then (2) uplift and further deep weathering under a moist and warm climate, next possibly (3) glaciation followed by (4) arid, cold, desert conditions, and finally (5) slow submergence and encroaching of sea from the northeast. The late Cambrian and early Ordovician record is one of intermittent submergence and elevation. From the history of the region to the north it is almost certain that Chazy, Black River, and Trenton seas covered this area but their deposits have all been removed by erosion with the possible exception of a local thin bed of Trenton limestone. By the end of the Mesozoic the general region had been reduced to a peneplain. This peneplained surface is recorded by the high land with a nearly even sky-line. This peneplain was elevated, dissected by Tertiary rivers, and before Pleistocene glaciation, wide flat areas were developed which record a late Tertiary peneplain. The author calls attention to the close resemblance between the Mesozoic, Tertiary, and recent history of the region and the late pre-Cambrian and Cambrian history as outlined above.

J. F. W.

The Pre-Cambrian Rocks of the Canton Quadrangle. By JAMES C. MARTIN. New York State Museum Bulletin, No. 185. Albany, N.Y., 1916. Pp. 112, pls. 20, figs. 30, maps 1.

The Canton Quadrangle lies in northwestern New York State about 12 miles east of Ogdensburg on the St. Lawrence River and 30 miles east of the Thousand Islands region. The geology is very similar to that of the Adirondack Mountains while the physiography is that of a line of foothills which mark the approach of the rugged interior to the southeast.

The oldest rocks, Grenville sediments, are crystalline limestone, garnet gneiss, quartzite, quartz-schist, and various other siliceous and pyritous gneisses. Owing to intense post-Grenville deformation no good continuous sections of the sediments remain, but the probable thickness is somewhere about two or three miles. The various rock